

Serial No. 09/548,414  
August 1, 2005  
Reply to the Office Action dated February 4, 2005  
Page 2 of 8

**AMENDMENTS TO THE CLAIMS:**

This listing of claims will replace all prior versions, and listings, of claims in the application:

**LISTING OF CLAIMS:**

Claim 1 (previously presented): A method of manufacturing an external force detection sensor comprising the steps of:

- providing a semiconductor element substrate;
- forming a recess in a surface of the semiconductor element substrate;
- forming an etching stop layer of an electrically conductive material on the surface of the semiconductor element substrate having the recess formed therein;
- through-hole dry etching the surface of the semiconductor element substrate using the etching stop layer;
- forming a sensor element including a vibrating body, fixed electrodes and movable electrodes on the semiconductor element substrate;
- removing the etching stop layer; and
- completing the manufacturing of the external force detection sensor.

Claim 2 (currently amended): A method of manufacturing an external force detection sensor comprising the steps of:

- forming a recessed part on a back surface side of a semiconductor element substrate;
- forming a membrane on a front surface side;
- providing an etching stop layer comprising an electrically conductive material on a top surface of the recessed part of said semiconductor element substrate;
- joining the back surface side of said semiconductor element substrate with a support substrate; and

forming a sensor element including a vibrating body, fixed electrodes and movable electrodes by dry etching of the membrane of said semiconductor element substrate;

removing the etching stop layer; and

completing the manufacturing of the external force detection sensor.

Claim 3 (previously presented): A manufacturing method of an external force detection sensor according to claim 2, wherein the recessed part is formed in a center portion of the back surface side of the semiconductor element substrate.

Claim 4 (canceled).

Claim 5 (previously presented): A method of manufacturing an external force detection sensor according to claim 13, wherein the dummy support substrate and the etching stop layer are removed after the sensor element is formed and, after that, a support substrate with a recessed part formed therein is arranged on the back surface side of said semiconductor element substrate such that the recessed part of said support substrate is arranged opposite to the sensor element and, then the support substrate is joined with the semiconductor element substrate.

Claims 6-8 (canceled)

Claim 9 (previously presented): A method of manufacturing an external force detection sensor according to claims 2 or 3, wherein the semiconductor element substrate is formed of a silicon material, the support substrate is formed of a glass material, and the semiconductor element substrate is anodically joined with the support substrate.

Serial No. 09/548,414  
August 1, 2005  
Reply to the Office Action dated February 4, 2005  
Page 4 of 8

Claim 10 (currently amended): A method of manufacturing an external force detection sensor according to one of claims 1, 2 or 3, wherein the etching stop layer is formed of an electrically conductive material whose etch selectivity which is the ratio of the dry-etch rate of ~~a~~the semiconductor element substrate to the dry-etch rate of an etching stop layer is not less than 1.

Claim 11 (canceled).

Claim 12 (original): A method of manufacturing an external force detection sensor according to claim 10, wherein the etching stop layer is made of titanium or aluminum.

Claim 13 (previously presented): A method of manufacturing an external force detection sensor according to claim 1, further comprising the step of providing a dummy support substrate to support the semiconductor element substrate during the step of through-hole dry etching of the semiconductor element substrate to form the sensor element, wherein the etching stop layer is formed between the semiconductor element substrate and the dummy support substrate.

Claim 14 (currently amended): A method of manufacturing an external force detection sensor according to claim 1, wherein the etching stop layer is formed in a preset sensor element forming area on ~~the~~a back surface side of the semiconductor element substrate.

Claim 15 (previously presented): A method of manufacturing an external force detection sensor according to claim 1, further comprising the step of forming a membrane by machining a preset sensor element forming area of the semiconductor element substrate from both front and back surface sides, and then forming the etching

stop layer on a back surface side of the membrane.

Claim 16 (currently amended): A method of manufacturing an external force detection sensor comprising the steps of:

- providing a semiconductor element substrate;
- providing a support substrate;
- forming a recess in a surface of the semiconductor element substrate;
- providing an etching stop layer comprising an electrically conductive material on a back surface of said semiconductor element substrate;
- joining ~~the~~ a back surface side of said semiconductor element substrate with a surface of the support substrate having said recess formed therein; and
- forming a sensor element including a vibrating body, fixed electrodes and movable electrodes by dry etching of said semiconductor element substrate;
- removing the etching stop layer; and
- completing the manufacturing of the external force detection sensor.

Claim 17 (previously presented): A method of manufacturing an external force detection sensor according to claim 16, wherein the etching stop layer is formed of an electrically conductive material whose etch selectivity which is the ratio of the dry-etch rate of the semiconductor element substrate to the dry-etch rate of an etching stop layer is not less than 1.

Claim 18 (previously presented): A method of manufacturing an external force detection sensor according to claim 16, wherein the etching stop layer is made of titanium or aluminum.